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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,993	05/31/2005	Toshitsugu Sakamoto	8017-1169	9950

466 7590 01/18/2007

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EXAMINER	
CRUZ, LESLIE PILAR	
ART UNIT	**PAPER NUMBER**
2826	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,993	SAKAMOTO ET AL.	
	Examiner	Art Unit	
	Leslie P. Cruz	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,20 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,20 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Minhloan Tran
Primary Examiner
Art Unit 2826

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05/31/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, drawn to a semiconductor device in the reply filed on 10/10/2006 is acknowledged. Accordingly, pending in the Office Action are claims 1-10, 20 and 21.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The Information Disclosure Statement filed on 05/31/2005 has been considered.

Oath/Declaration

The oath or declaration filed on 05/31/2005 is acceptable.

Drawings

The drawings filed on 05/31/2005 are acceptable.

Claim Objections

Claim 1 is objected to because of the following informalities: a prefix (e.g. "a") should be in front of "connection plug" in line 2. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 5, 7, 9 & 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Awano (US 2002/0163079 A1).

With respect to claim 1, Awano (e.g. Figs. 1, 4, 5D & 6) discloses a semiconductor device comprising a connection plug [15] wherein a nanomaterial [16] is substantially uniformly disposed in a section of the connection plug formed from a metal [18].

With respect to claim 3, Awano discloses the semiconductor according to claim 1. Awano further discloses the nanomaterial is a fibrous carbon nanomaterial or a particle-like carbon nanomaterial.

With respect to claim 5, Awano discloses the semiconductor according to claim 1. Awano further discloses the nanomaterial is oriented substantially perpendicularly to a substrate [0075].

With respect to claim 7, Awano discloses the semiconductor according to claim 1. Awano (e.g. Figs. 1 & 4) further discloses the nanomaterial is provided in the whole connection plug.

With respect to claim 9, Awano discloses the semiconductor according to claim 1. The limitation "the metal is formed by an MOCVD method or a plating method" is a product by process limitation and is not given patentable weight. Therefore, claim 9 is not patentably distinguishable over the Awano reference. See note below.

With respect to claim 20, Awano discloses the semiconductor according to claim 1. Awano (e.g. Figs. 1, 4, 5D & 6) further discloses the connection plug is formed from a metal [18] containing a nanomaterial [paragraph 0076]. The limitation "metal is formed by a plating method which involves a plating liquid" is a product by process limitation and is not given patentable weight. Therefore, claim 20 is not patentable distinguishable over the Awano reference. See note below.

Claims 2, 4, 6, 8, 10 & 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Haase (US 2003/0211724 A1).

With respect to claim 2, Haase (e.g. Figs. 1 & 2) discloses a semiconductor device comprising an interconnection [24] wherein nanomaterial [32] is substantially uniformly formed on a bottom surface of the interconnection [30] formed from a metal [paragraph 0015].

With respect to claim 4, Haase discloses the semiconductor device according to claim 2. Haase further discloses the nanomaterial is a fibrous carbon nanomaterial or a particle-like carbon nanomaterial [paragraph 0015].

With respect to claim 6, Haase discloses the semiconductor device according to claim 2. Haase (e.g. Figs. 1 & 2) further discloses the nanomaterial is oriented substantially perpendicular to a substrate [16].

With respect to claim 8, Haase discloses the semiconductor device according to claim 2. Haase (e.g. Figs. 1 & 2) further discloses the nanomaterial is provided up to the vicinity of a top surface of the interconnection.

With respect to claim 10, Haase discloses the semiconductor device according to claim 2. The limitation "the metal is formed by an MOCVD method or a plating method" is a product by process limitation and is not given patentable weight. Therefore, claim 10 is not patentably distinguishable over the Haase reference. See note below.

With respect to claim 21, Haase discloses the semiconductor according to claim 2. Haase further discloses the interconnection is formed from a metal containing a nanomaterial [paragraph 0015]. The limitation "metal is formed by a plating method which involves a plating liquid" is a product by process limitation and is not given patentable weight. Therefore, claim 20 is not patentable distinguishable over the Haase reference. See note below.

Product by Process

Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao, 190 USPQ 15 at 17* (footnote 3). See also *In re Brown, 173 USPQ 685*; *In re Luck, 177 USPQ 523*; *In re Fessmann, 180 USPQ 324*; *In re Avery, 186 USPQ 161*; *In re Wertheim, 191 USPQ 90* (*209 USPQ 554* does not deal with this issue); and *In re Marosi et al., 218 USPQ 289*, all of which make it clear that it is the patentability of the final product per

se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in " product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP § 706.03(e).

Telephone/Fax Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie P. Cruz whose telephone number is (571) 272-8599. The examiner can normally be reached on Monday-Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Wael Fahmy and Bob Pascal can be reached on (571) 272-1705 and (571) 272-1769, respectively. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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